

361
2F4
30

United States Department of the Interior, J. A. Krug, Secretary
Fish and Wildlife Service, Albert M. Day, Director

Fishery Leaflet 230

Chicago 54, Ill.

March 1947

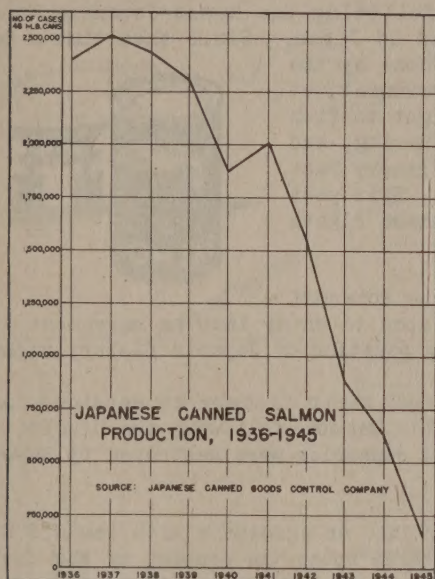
THE JAPANESE SALMON INDUSTRY

General Headquarters
Supreme Commander for the Allied Powers
Natural Resources Section
Report No. 31
Tokyo 1946

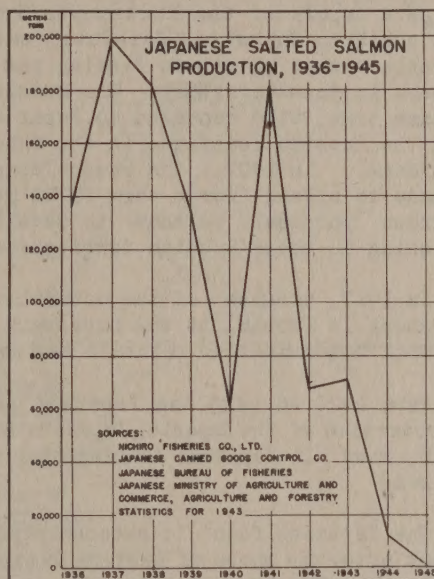


THE JAPANESE SALMON INDUSTRY *

The salmon industry was, at one time, of great importance to the economy of Japan. The Japanese salmon industry reached its peak in 1937 with a total output of canned salmon amounting to about 2,500,000 cases^{1/} valued at approximately 40,000,000 yen. In that same year the production of salted salmon was nearly 200,000 metric tons (Graphs 1 and 2). From 1937 until the outbreak of naval warfare in the Pacific prior to the 1942 season, Japan ranked second only to the United States in the production of processed salmon. About 87 percent of the exported canned salmon was sent to Great Britain, four percent to France, and most of the remainder to other European countries.



Graph 1



Graph 2

At the present time Hokkaido is the principal source of the greatly reduced salmon catch. Prior to 1945, the waters around Kamchatka, Sakhalin, and the northern Kuril Islands provided practically all of the salmon used for canning and salting (see Plates 1 and 2, pages 10 and 11).

Recently, because of the shortage of foodstuffs in Japan, and because Japan has been cut off from foreign trade, a marked increase in domestic consumption of canned salmon has taken place.

Because the Japanese floating canneries were sunk during the recent hostilities, and because Allied naval action disrupted communications with the canneries

*This report is based on information gathered and compiled by Captain Verne W. Broadbent, Natural Resources Section, General Headquarters, Supreme Commander for the Allied Powers, Tokyo. (Reproduced by permission of the Civil Affairs Division, War Department).

Note: This leaflet supersedes Sep. 143, a reprint from Commercial Fisheries Review, July 1946, pages 8-19.

in Kamchatka, Japanese salmon production has shown an enormous decrease since 1941 (Graphs 1 and 2, page 8). It is, therefore, necessary to base the statements in this report on conditions as they existed prior to 1942. Production data were obtained from many sources. Where discrepancies occurred, the most realistic figures were used.

Inasmuch as most of the Japanese salmon industry was centered in waters controlled by another nation, the industry was subject to numerous international agreements.

In 1875, when the treaty which provided for the exchange of Sakhalin for the Kurils was signed by Russia and Japan, the stipulation was made that Japanese vessels were to have the same privileges in the Okhotsk Sea as were the Russians.

As a result of the Portsmouth Treaty following the Russo-Japanese War in 1905, southern Sakhalin (Karafuto) was ceded to Japan. Since that time a considerable amount of salmon fishing has been done by the Japanese in this territory. The Russian Government, at the same time, also conceded to Japan the right to fish along the Russian coastline in the Okhotsk, Bering, and Japan Seas. In 1907, the Russo-Japanese Fishery Pact was made to extend for a term of 12 years. This pact was drawn purposely to show in detail Japanese rights in fishing in these Russian territories.



In 1917, because of the downfall of the Romanoff Government in Russia, it was necessary for Japan to enter into an agreement with the Tomsk Government to maintain the existing position of Japan's fishery rights.

From 1920 to 1925 the Japanese placed all their fishery concessions under the protection of the Imperial Japanese Army. This was done following the Nicolovitsky Affair, when all Japanese landing stations and canneries were destroyed by Russian partisans.

The Japanese found it necessary to enter into an agreement with the U.S.S.R. in 1928 after the whole of eastern Russia was taken under the control of the Soviet Government. The agreement gave Japan the right to fish on the entire coast of the far-eastern Soviet territory, except for a few specified ports.

Until 1928, Japanese fishing concerns had occupied 80 percent or more of the fishing grounds in eastern Russia. Between 1928 and 1931 Soviet interests practically reversed this situation. This was done by the State enterprise taking over the leases of the Japanese as they expired.

On April 2, 1939, a temporary agreement was signed which provided that the Fishery Convention of 1928 remain in force until the end of 1939.

At this time the Soviets established the principle that, even though the Portsmouth Treaty in 1905 had given Japan a right to fish in Russian waters, the Soviet Government still had the power to determine where the Japanese could fish and to make the terms for leasing these territories.

In January 1940, another provisional agreement was concluded. During the 1940 season, 142 Japanese vessels operated in Soviet waters, catching 332,000 metric tons of fish. Almost 20,000 men were employed.

GENERAL HEADQUARTERS
SUPREME COMMANDER FOR THE ALLIED POWERS
NATURAL RESOURCES SECTION

NICHIRO FISHERIES COMPANY SALMON LAND BASE OPERATIONS

SEA OF OKHOTSK

KAMCHATKA

SAKHALIN

KURIL ISLANDS

LEGEND:

- AREA, SPECIES AND NUMBER OF SALMON CAUGHT PER SEASON FOR LAND BASE OPERATIONS
- SALMON CANNERIES (42)
- LANDING BASES FOR SALMON AND CRAB
- COLD STORAGE AND FREEZING PLANTS (46)
- NICHIRO MAIN OFFICE

FIGURES SHOWN ADJOINING CANNERIES INDICATE CAPACITY OF DAILY OUTPUT OF CASES (48/11B).

3

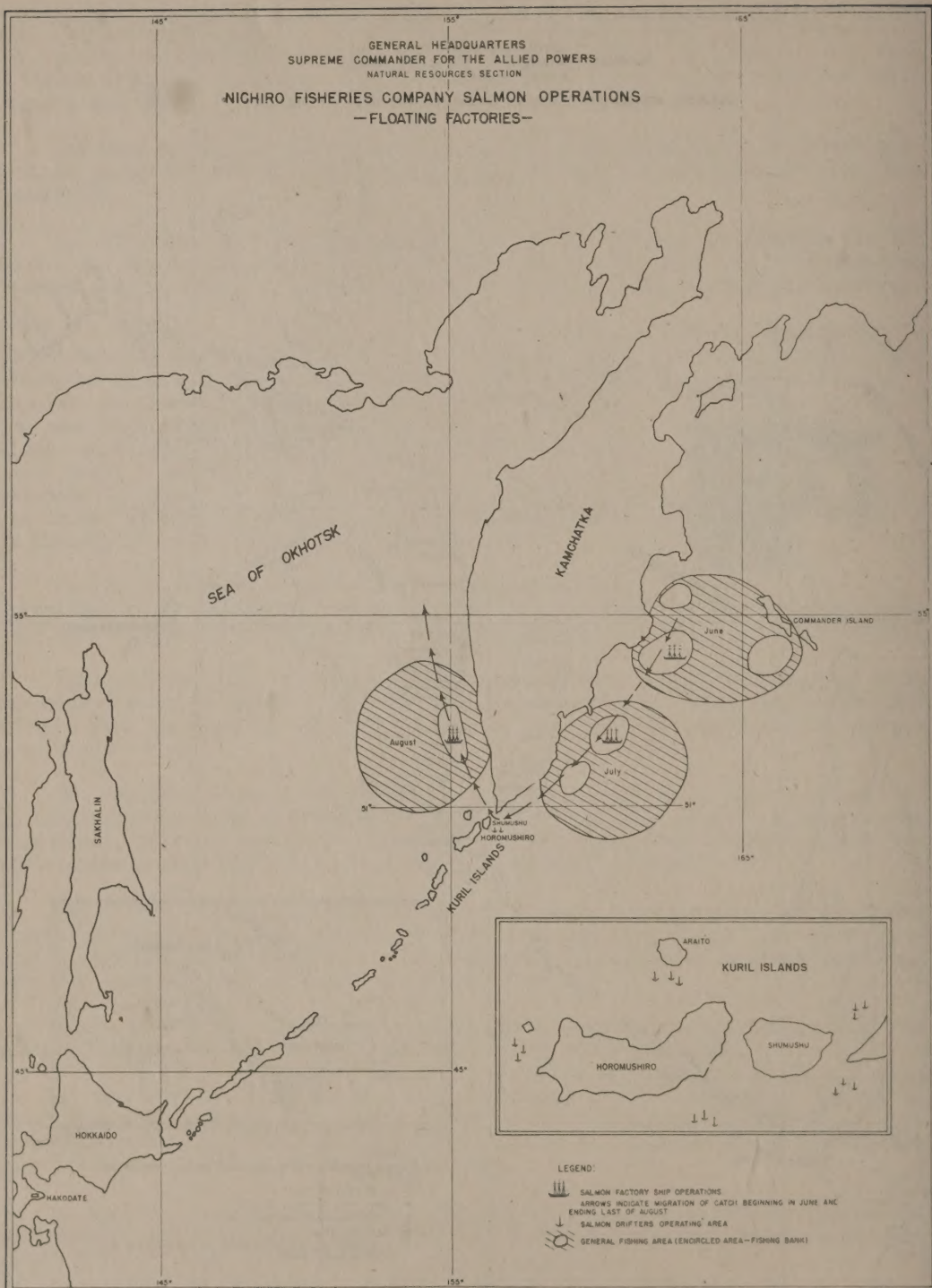


PLATE 2

A provisional agreement to extend the Fishery Convention of 1928 until the end of 1941 was signed at Moscow on January 20, 1941. A renewal for 1942 was effected on March 20, 1941.

In July 1941, the Soviet Government designated certain coastal waters wherein fishing by Japanese nationals was to be prohibited until the end of the war in the Pacific. It was agreed by the Japanese Government that they were not to exploit the fishing lots rented by Japanese nationals on the eastern coast of Kamchatka Peninsula and in the Olyutor region until the cessation of hostilities in the Pacific.

In 1944 the Fishery Convention was renewed to become effective March 30, 1944, with the following changes:

- a. Renewal was to be in effect for a period of five years instead of the usual one-year term.
- b. Russian fishing organizations were to be given the right to purchase ten percent of the Japanese fishing lots, which were to be offered at auction.
- c. Because they were not exploited, 24 of the fishery lots, amounting to about eight percent of the entire number of lots which were under lease by the Japanese, were not to be leased again.
- d. Rentals were to be increased about six percent over previous leases.
- e. All articles of the Convention which related to the fishing activities of the Soviet Union were abolished as no longer applicable.

The salmon industry came to a virtual standstill in 1945. When Soviet Russia entered the war in August and subsequently occupied the Kuril Islands, an estimated 4,500 Japanese cannery workers and technicians were in Kamchatka and the Kurils. According to the Nichiro Fisheries Company, nearly all of these men are still in Soviet territory. Left behind in these areas were 3,000 metric tons of salted salmon and 260,000 cases of canned salmon; most of this had been packed during the 1944 season.

Japanese salmon fishing activities expanded to include North American waters as well as Asiatic. Salmon fishing off the coast of Alaska provoked a storm of protest from American fisheries interests. This expansion was part of a three-year program begun in 1936 by the Japanese Ministry of Agriculture and Forestry to investigate the salmon fishing possibilities on the high seas off the Alaskan coast.

The American fishing interests protested against the Japanese floating canneries taking red salmon in Bristol Bay. After an exchange of notes between the United States and Japanese Governments, Japan agreed to abandon this survey in March 1938.

Over a period of years, the number of Japanese fishing companies participating in the auction of fishing areas so increased that competition became keen. About 1915, at least 100 separate enterprises were in existence. Between 1915 and 1932 many of these companies merged, and by 1932, about 30 concerns were in operation. At this time, all the Japanese fishing interests in Soviet waters were placed under the united control of Nichiro Gyogyo Kaisha (Japanese-Russian Fishery Company), which thereby acquired a monopoly of leased lot fisheries. The Nichiro Fisheries Company is still the largest producer of salmon and crab in Japan.

The canned goods that were packed in the Russian territory, either at Japanese land stations or by floating canneries, were shipped directly to foreign markets. The proceeds from these products were listed under the head of "Revenue," and so were not entered in the returns of the foreign trade of Japan.

The following five species of salmon are used by the Japanese for processing:

- a. King salmon (Oncorhynchus tshawytscha): The flesh is of medium texture with plenty of oil and a fine flavor. The king salmon was at one time the most popular for canning, but recently, much of the catch has been marketed frozen. This is the largest species of salmon, ranging in weight from 20 to 80 pounds.
- b. Red salmon or sockeye (O. nerka): This species is caught around Kamchatka and the northern Kurils. It is the most desirable species for canning, and formerly made up about half of the salmon export trade of Japan. The average weight of the red salmon is eight pounds.
- c. Silver salmon (O. kisutch): This species is caught mostly around Kamchatka and the northern Kuril Islands. The silver salmon is of a less firm texture than the red salmon, and the meat is light red in color. The average weight of the silver salmon is about six pounds.
- d. Pink salmon or humpback (O. gorbuscha): This species derives its names from the color of the flesh and the shape of the fish. It is not so firm in texture as the other varieties, but has a good flavor and is an economical food. The pink salmon is a small species, weighing on the average only about four pounds.
- e. Chum or dog salmon (O. keta): The meat of the chum salmon is not so firm as other species but because of its nice color, distinctive flavor, and low price, it is a popular product. After canning, the flesh is a light yellow color. The average weight of the chum salmon is eight pounds.

The home base for salmon and trout fishing operations in northern waters is located at Hakodate, Hokkaido. Transport vessels, after being loaded with the season's supply of foodstuffs, materials for repair, and equipment sailed for their respective landing stations or canneries toward the end of May each year. The fishing fleets put to sea as soon as shore stations were placed in repair for the season's operations.

In the processing of salmon, the first operation is one of grading. Grading determines which fish are to be packed in cans, and which are to be salted, smoked, dried, or frozen. The freshest fish of the best quality are used for canning.

Fish for canning are segregated according to variety and quality, as follows:

<u>Variety of Fish</u>	<u>Grades</u>
Red, Silver, and King Salmon	Fancy, Standard, and Non-exportable
Pink and Chum Salmon	Choice, Standard, Passed and Non-exportable
Titbits (neck meat of Red, Silver, and King)	"A" grade and Non-exportable
Sliced, smoked salmon in olive oil	Passed grade

Fish which are rejected for canning purposes are either sold on the fresh fish markets or put into reduction plants with the offal from the canning operations. This residue is made into fertilizer or fish meal and oil.

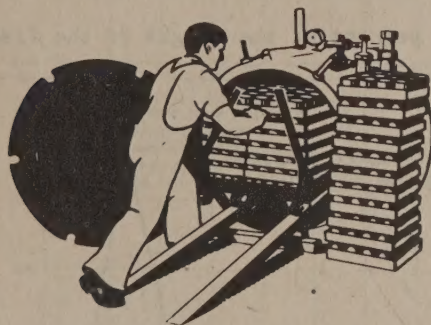
Briefly, the canning process is as follows: Fish are unloaded from the boat onto the cannery wharf; after sorting, they are conveyed into the plant, cleaned, cut to size, and packed in cans; the cans are exhausted and sealed, or vacuum sealed without the exhaust cook; the cans are then given the final sterilizing cook in pressure retorts.

Formerly it was thought that, in order to improve the pack, fish should stand 12 to 24 hours after being landed. Often fish were held too long and spoilage occurred. Hence this practice has been discontinued.

Most of the land and floating canneries are equipped with cutting machines commonly known as "guillotines" and "iron chinks." These machines cut off the heads, fins, and tails, split the bellies, and remove the viscera and slime. Other plants are equipped with somewhat different sliming machines. The fish are then cleaned and cut into lengths, depending on the size of the can.

Most of the cans are filled by machine, but it has been proved that hand-packing results in a far superior product. After the cans are packed and the weights are checked, the cans are either run through an exhaust box and then sealed or sealed by a vacuum-sealing machine without the exhaust cook. In plants which use an exhaust box, cans are first run through a clincher which puts the lids on loosely. The exhaust process takes 15 to 30 minutes at a temperature of 210° F.

After the cans are run through a washer, they are cooked in retorts to sterilize the contents. The retorting is done in large steel, horizontal, cylindrical tanks capable of holding from 45 to 90 cases of one-pound cans each or twice that amount of half-pound cans. The one-pound tins which have been given an exhaust cook are cooked under steam pressure for 80 minutes at a temperature of 240° F. Half-pound cans are cooked for 60 minutes; quarter-pound cans for 45 minutes. Vacuum-sealed cans are retorted for an additional 10-minute period.



In most land canneries, cans are cooled with cold water after retorting. In case of a shortage of water, the cans are allowed to cool in the open air; this is a slower

process. Following the cooling, cans are labelled and cased, and are ready for shipment.

At one time, the Japanese Canners' Association was actively engaged in the inspection of canned salmon. The inspection covered the color of meat, amount of skin, oil, liquid and salt, texture, odor, and taste of the fish, amount of vacuum, head space, weight, and thoroughness of cook. Lately, little inspection, if any, has been made. In many cases, it has been found that during the cooking process the temperature was allowed to drop one or two degrees below the prescribed minimum with no correction or recook being made.

All species of salmon may be salted or smoked, but the most desirable varieties for these purposes are the pink and chum salmon.

Salted salmon comes in two grades. The excellent, or first grade, is called "aramaki," and the ordinary grade is known as "kairyo." The difference between

the two grades is determined by the quality and condition of the fish and also by the process of preparation.

First grade salmon are salted and packed individually in boxes. As soon as the fish are caught, they are cleaned thoroughly and washed. They are then drained of all water. After salt has been put in the gill slits and bellies, the fish are placed in wooden boxes of about 15 to 20 fish each. The boxes are kept in cold storage until the fish are to be used.

Ordinary grade salted salmon is prepared either by salting in tanks or by mass salting. In the tank method, the fish are placed in tanks of either wood or concrete after they have been cleaned and drained. They are salted thoroughly by layers. The top layer is heavily salted, and the tank is covered with canvas. After seven days the fish are put in wooden boxes for shipment. In the mass method, fish are piled on mats and salted heavily. After being kept covered with salt and protected by canvas for a period of 20 days, the fish are packed in wooden boxes.

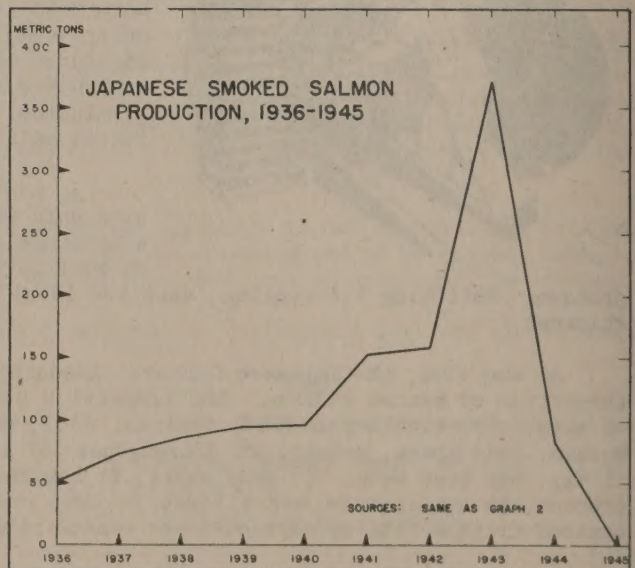
Large quantities of salt are required in the preparation and packing of salted salmon. The amounts of salt used, expressed as a percentage of the weight of the raw fish, are as follows:

<u>Type of Salting</u>	<u>Percentage of Weight</u>
Aramaki	18 to 20
Tank	20
Mass	32

Additional salt in the amount of 8 to 16 percent of the weight of the fish is needed for repacking in boxes after the initial process.

Salted salmon may be kept for as long as one year without spoiling if stored in a cool place.

The salted fish are soaked in fresh water for one or two days in order to remove some of the salt. They are then cut lengthwise, separating the backs from the bellies. The sections are dried in the shade for one day; they are then hung in the smokehouse by the tail and subjected to the smoke of some type of hardwood, such as white oak, along with sawdust. The sections are smoked for about 10 hours daily for 18 to 21 days consecutively at temperatures ranging from 60° to 80° F.



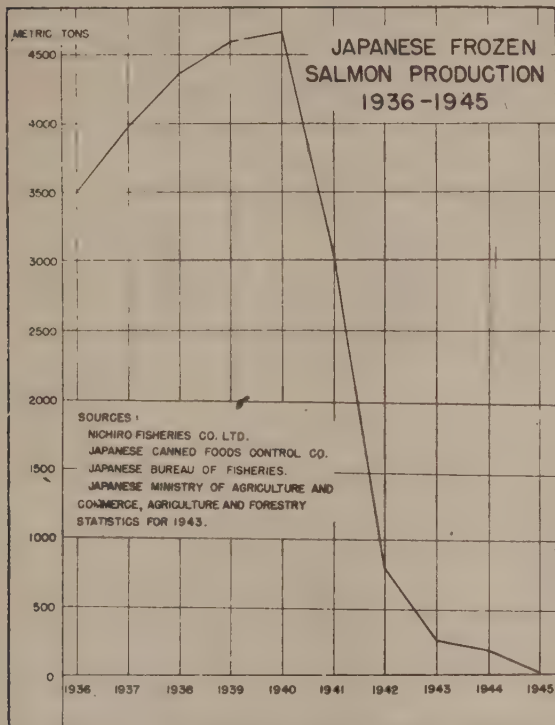
Graph 3

Nichiro Fisheries Company has one salmon-smoking factory which is in condition for immediate operation. This plant is located at Oiwakecho, Kamiise Gun,

Hokkaido. The six buildings of the factory have a floor space of 14,565 square feet and contain 20 smoking chambers. The capacity of this factory is 60,000 smoked red salmon per month (Graph 3, page 15).

Methods for preserving salmon and other marine products by means of cold storage and freezing have undergone many changes since 1918, when Mr. Ihei Kuzuhara first started a freezing business using an air sharp-freezing process. In 1923, the Hayashikane Company adopted the Ottesen quick-freezing process, which at that time was considered the best method for fish freezing.

Some varieties of fish are more suitable for freezing than others, salmon being one of the best. The most desirable species are red and pink salmon. Extensive developments have been made in Kamchatka and Hokkaido, both at land stations and on fishing and factory vessels, toward better methods of freezing.



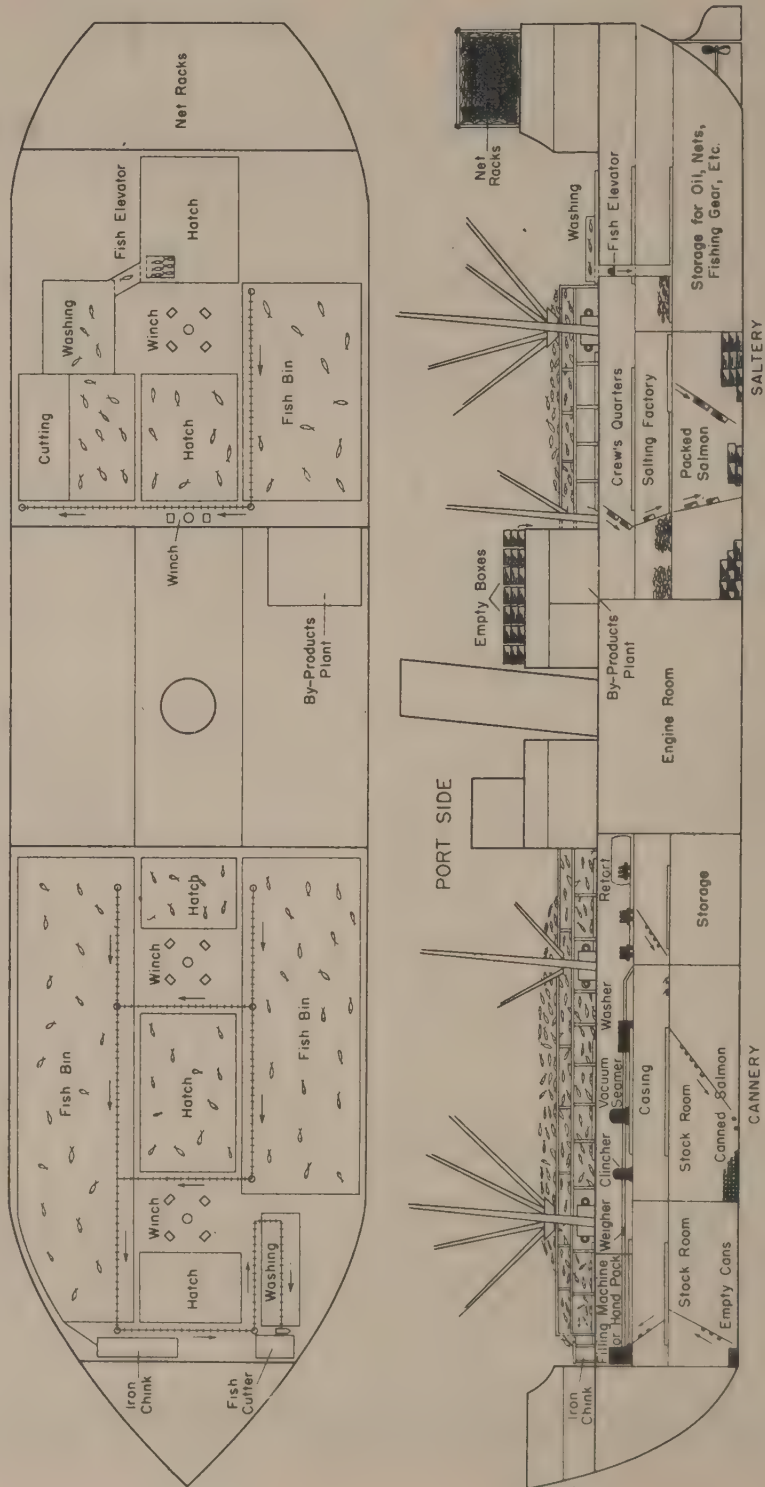
Graph 4

migration. Floating canneries, with their fleets of fishing vessels, changed this method by being able to fish in deeper water offshore.

At the outset of the operation of factory ships, coastal fishermen suffered considerably because the ships were catching a large majority of the salmon. The Japanese Government intervened, and in 1935, virtual control over both coastal and offshore fishing was granted to the Nichiro Fisheries Company. Japanese regulations prohibited the operation of salmon mother ships south of 51 degrees North Latitude to protect the coastal fisheries of Hokkaido, Karafuto, and the Kuril Islands.

In northern waters, the floating salmon canneries operating outside the three-mile limit were in direct competition with both Japanese and Soviet shore can-

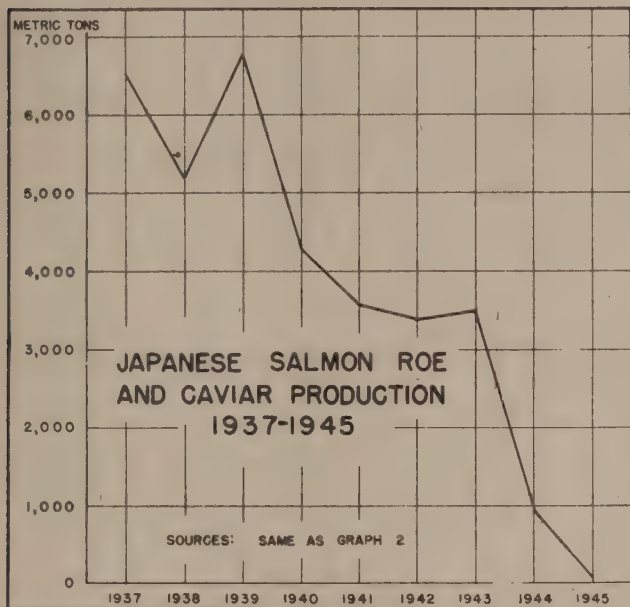
SKETCH OF FLOATING SALMON FACTORY



DRAWING ADAPTED FROM ILLUSTRATION FURNISHED BY NICHIRD FISHERIES CO.

neries on the leased lots. It has been said that the Japanese used the threat of engaging more factory ships to compete with Russian shore stations in order to secure better terms in the negotiations for renewal of fishing lot privileges.

At the peak of its floating cannery operations, the Nichiro Fisheries Company owned nine factory or mother ships ranging in size from 1,500 to 6,200 gross tons each. The factory ships were completely equipped for canning, salting, and freezing (Plate 3, page 17). A byproducts plant was also installed on each factory ship for the processing of salmon eggs, roe, and salmon caviar (Graph 5).



Graph 5

The mother ship provided each small craft with 100 to 130 drift gill nets of about 180 feet in length and with other necessary fishing equipment, fuel oil, and supplies. The boat captains were issued orders as to where to fish by the factory ship's fishing foreman, who had previously made investigations as to the most promising fishing areas.

When the salmon were brought to the factory ship, they were first sorted for either canning or salting, according to species and freshness, and dispatched to the cannery or saltery. Processing methods were the same as at the shore stations.

Factory ships were equipped with radio in order to keep the main office informed as to location, daily catches, weather conditions, and needs for repair parts and supplies. The ships also made arrangements with Hakodate for transshipment of stocks when production was large enough to warrant shipment.

Summary

The Japanese salmon industry reached its peak in 1937 with a production of 2,500,000 cases of canned salmon and 200,000 metric tons of salted salmon. Be-

Factory ships left Hakodate with complete equipment each season about the middle of May, to arrive outside of territorial waters off the Kamchatka coast near the end of May. Here they anchored to await the arrival of the fishing boats.

Each factory ship was supplied with the catches of 50 or 60 fishing craft of 30 to 50 gross tons each. These vessels sailed in fleets from Hakodate and other bases to arrive at the fishing grounds and begin operations the first of June. Fishing continued until about the end of August, depending upon the run of fish each season. The location of the fishing grounds is shown in Plate 2 (page 11).

cause of wartime conditions, the output of this industry had shrunk to 100,000 cases of canned salmon and 600 metric tons of salted salmon in 1945.

Most of the Japanese salmon catch was made in Kamchatka and the northern Kuril Islands. About 20,000 Japanese were employed in the land and floating canneries and in fishing activities.

The bulk of the Japanese canned salmon production was exported prior to 1940; an estimated 87 percent of the exports went to Great Britain.

JAPANESE PROCESSED SALMON PRODUCTION, 1936-1945

Years	Salted Salmon	Smoked Salmon	Roe and Caviar	Frozen Salmon
	(unit: metric tons)			
1936	136,497	52	--	3,504
1937	197,635	74	6,503	3,956
1938	184,018	86	5,164	4,376
1939	135,992	95	6,777	4,591
1940	63,167	97	4,295	4,682
1941	185,372	153	3,562	3,044
1942	67,413	159	3,384	793
1943	77,177	373	3,491	247
1944	12,224	83	937	182
1945	627	--	52	18

Source: Nichiro Fisheries Company, Ltd.
 Japanese Canned Goods Control Company.
 Japanese Bureau of Fisheries.
 Japanese Ministry of Agriculture and Commerce, Agriculture
 and Forestry Statistics for 1943.

Table 1

JAPANESE CANNED SALMON PACK BY LOCALITY, 1936-1945

Year	Aomori	Hokkaido (unit: case of 48 pounds or 21.8 kilograms net weight)	Karafuto	Kuril Islands	Kamchatka	Floating Canneries	Others	T O T A L
1936	196,866	213,057	18,656	558,979	1,115,588	285,541	12,756	2,401,443
1937	165,135	214,260	60,562	612,505	1,077,769	371,229	22,858	2,524,318
1938	194,408	189,498	1,879	528,264	1,200,635	322,597	1,008	2,438,289
1939	149,499	165,756	18,245	453,609	1,125,836	383,649	287	2,296,881
1940	47,241	63,182	10,132	450,690	975,624	302,562	15,573	1,875,004
1941	37,789	54,772	11,917	448,775	1,110,161	331,539	8,020	2,002,973
1942	36,476	32,365	1,104	458,064	829,643	196,887	--	1,554,539
1943	--	--	--	417,606	454,304	--	--	871,910
1944	--	--	--	272,427	351,766	--	--	624,193
1945	--	--	--	109,192	--	--	--	109,192

Source: Japanese Canned Goods Control Company.

Table 2

DISTRIBUTION OF JAPANESE SALMON PRODUCTS, 1938-1945

Distribution	1938	1939	1940	1941	1942	1943	1944	1945
	(unit: canned cases of 48 pounds or 21.8 kilograms net weight)							
Canned Salmon*								
Home Cons'pt'n	595,740	--	1,738,876	1,900,355	1,484,594	871,910	624,193	109,192
Export								
Asia	202,300	113,600	--	--	--	--	--	--
Europe	2,250,086	1,951,809	--	--	--	--	--	--
Africa	65,362	91,380	--	--	--	--	--	--
America	11,482	21,117	--	--	--	--	--	--
Australia	101,148	107,417	--	--	--	--	--	--
Total (Cases)	3,226,119	2,285,323	1,738,876	1,900,355	1,484,594	871,910	624,194	109,192

	(unit: metric tons)							
Salted Salmon**								
Home Cons'pt'n	165,163	98,023	58,383	181,197	65,652	76,896	11,616	627
Export								
Asia	18,855	37,969	4,784	4,175	3,761	281	608	--
Total (metric tons)	184,018	135,992	63,167	185,372	67,413	77,177	12,224	627

Frozen Salmon***								
Home Cons'pt'n	3,328	3,657	4,671	3,044	793	247	182	18
Export								
Europe	1,048	934	11	--	--	--	--	--
Total (metric tons)	4,376	4,591	4,682	3,044	793	247	182	18
By-Products****								
Home Cons'pt'n	4,973	6,600	4,295	3,562	3,384	3,491	937	52
Export								
Asia	18	21	30	--	--	--	--	--
Europe	153	140	--	--	--	--	--	--
Africa	20	16	--	--	--	--	--	--
Total (metric tons)	5,164	6,777	5,325	3,562	3,384	3,491	937	52

- * Red, Silver and part of pink salmon production shipped direct to London and Liverpool. Remainder of pink sold on domestic market.
 - ** Salt salmon stored in company's warehouses for distribution. Chum salmon for domestic consumption. Pink chiefly exported to Shanghai, Darien and Formosa, remainder for domestic market.
 - *** Exports chiefly to Great Britain and France.
 - **** Chiefly salmon caviar. Exports chiefly to Balkans, France and Poland.
- Source: Nichiro Fisheries Company, Ltd.

Table 3

JAPANESE PRODUCTION OF SALMON BY SPECIES, 1939-1945

Species	1939	1940	1941	1942	1943	1944	1945
(unit: canned, cases of 48 pounds or 21.8 kilograms net weight)							
Canned Salmon							
Red	978,677	642,048	614,861	471,892	311,496	189,466	14,924
Silver	59,978	55,011	32,047	44,305	4,860	4,013	1,779
Chum	20	1,141	109	30,006	62,891	71,345	7,449
Pink	1,241,994	1,161,412	1,293,369	862,774	492,029	379,182	85,040
Others	16,212	15,392	62,587	145,562	634	187	--
Total - cases	2,296,881	1,875,004	2,002,973	1,554,539	871,910	624,193	109,192

		(unit: metric tons)					
Salted Salmon							
Red*	1,181	348	1,403	1,776	1,459	507	20
Chum	39,176	28,677	80,873	26,957	9,501	1,454	63
Pink	95,108	33,424	102,347	38,810	65,861	10,045	544
Others	527	718	749	870	356	218	--
Total (metric tons)	135,992	63,167	185,372	67,413	77,177	12,224	627
Frozen Salmon							
Red*	480	225	150	257	154	6	--
Chum	3,804	4,133	2,664	525	59	52	1
Pink	307	324	230	11	34	124	17

Total (metric tons)	4,591	4,682	3,044	793	247	182	18
By-Products							
Salmon Roe	4,147	2,738	3,111	2,975	3,112	883	50
Red Caviar	2,630	1,557	451	409	379	54	2
Total (metric tons)	6,777	4,295	3,562	3,384	3,491	937	52
Smoked Salmon							
Mostly Red (metric tons)	95	97	152	159	373	83	--

*Includes also silver and king salmon.

Source: Nichiro Fisheries Company Ltd.;

Japanese Canned Goods Control Company;

Japanese Bureau of Fisheries;

Japanese Ministry of Agriculture and Commerce, Agriculture and Forestry Statistics for 1943.

LOCATION OF NICHIRO SALMON ESTABLISHMENTS*
A. LANDING POINTS OF CATCHES

Districts	No. of Places	
Kamchatka, U.S.S.R.	72	West and East coasts of Kamchatka, Okhotsk and Maritime Province.
North Kuril Islands	30	Shimushu, Horomushiro, Araito, etc.
Hokkaido	6	Includes Kunashiri, Shikotan, Shibotsu and Sulaho in Sourthern Kuril Islands
Sakhalin (Karafuto)	1	Chinnai

B. PROCESSING EQUIPMENT

Districts	CANNERIES		SALTERIES		No. of cold storage plants
	No. of Canneries	Capacity per day (cases)	No. of salteries	Capacity per day (cases)**	
Kamchatka, U.S.S.R.	32	100,000	72	4,000	35
Shimushu and Horomushiro	8	24,700	32	1,800	3
Hokkaido	3	1,800	--	--	-
Shibotsu	1	400	--	--	-
Total	44	126,900	104	5,800	38

* Table lists establishments in use immediately prior to collapse of salmon industry in 1945. See Plate 1 for exact location of stations. Facilities used only incidentally for salmon as a sideline to other operations, such as cold storage plants in Hokkaido, are not included.

** Case of salted salmon: 47 to 51 kilograms.

Source: Nichiro Fisheries Company, Ltd.

Table 5

FLOATING FACTORY SHIPS OPERATED BY NICHIRO DURING 1940 SEASON

Name	Size, Gross Tons	Type of Factory Ship
Jinbu-Maru*	5,236	Salmon Cannery
Shinano-Maru	6,254	" "
Fukusei-Maru*	5,802	" "
Kosei-Maru*	5,430	" "
Tamatsu-Maru*	4,646	Salmon Saltery
Hoko-Maru*	1,521	" "
Chichibu-Maru*	1,525	" "
Haruna-Maru*	1,549	" "
Manko-Maru*	1,503	" "

*Sunk during the war (1941-1945).

Source: Nichiro Fisheries Company, Ltd.

Table 6

PROCESSING CREW OF A SALMON FACTORY SHIP*

Manager	Fishing Foreman		6 Assistants	63 Laborers— Sorting fish Cutting fish Washing Conveying
	175 Fishing operators			54 Salting processors 6 Supply men for fishing craft 5 Engine and hull repairmen 35 Laborers for loading and unloading of supplies and products 10 By-product processors 2 Medical men
	Cannery Foreman		6 Assistants	47 Laborers— Sorting fish Cutting fish Washing
Purser and 5 clerks	240 Factory operators			137 Fish packers 4 Mechanics 30 Casers 5 By-product processors 10 Warehousemen 7 Medical men, clerks and time-keepers

*In addition to the processing crew, the captain of each factory ship has a crew of approximately 50 men who assist in various processing operations besides their regular ship duties.
Source: Nichiro Fisheries Company, Ltd.

Table 7

CREW FOR EACH FISHING CRAFT*

Captain**

- | | |
|---|--|
| 1 | Chief engineer |
| 2 | Assistant engineers - Also assist with fishing operations. |
| 1 | Boatswain--Supervisor of fishing operations. |
| 1 | Cook |
| 8 | Sailors and fishermen. |

* Fishing craft used in connection with floating salmon factory operations.

**The captain of the fishing craft is the fishing chief and is responsible for navigation and catch.

Source: Nichiro Fisheries Company Ltd.